Effect of drying methods, solid-solvent ratio, extraction time and extraction temperature on phenolic antioxidants and antioxidant activity of Guiera senegalensis J.F. Gmel (Combretaceae) leaves water extract

ABSTRACT

Hot water extract of Guiera senegalensis leaves is used traditionally by women in Katsina State, Nigeria during postpartum period for general wellbeing. However the preparation of this beverage has not been optimized so far, which may underestimate its health benefit potentials. In this study, the effects of drying methods (air, oven and sun), solid- solvent ratio (1:10- 1:30), extraction time (30- 180 min) and extraction temperature (25- 85°C) on phenolic antioxidants and antioxidant activity of G. senegalensis were studied using Single Factor Experiment (SFE). Total Phenolic Content (TPC) and Total Flavonoid Content (TFC) assays were used to determine the phenolic antioxidants. Antioxidant activity was evaluated by measuring scavenging effect on 2,2'- diphenyl-1- picrylhydrazyl (DPPH) radical, Ferric Reducing Antioxidant Power (FRAP) and Total Antioxidant Capacity (TAC) using phosphomolybdate assay. Results showed that extraction conditions significantly ($P<0.05$) affect phenolic antioxidants extraction and antioxidant properties of G. senegalensis leaves water extract. The optimal conditions were air drying using 1:10 solid – solvent ratio for 60 minutes at 40°C with values of 2720.37 mg QE/g DW for TFC, 1431.74mg GAE/100g DW for TPC, 96.73% for DPPH scavenging, 2797.04mg AAE/100g DW for FRAP and 1144.49mg AAE/100g DW for TAC. TFC was found to be significantly correlated with TAC ($r2= 0.851$; $P<0.01$) and TPC with DPPH ($r2= 0.732$: $P<0.05$) under the influence of drying methods. TFC was also significantly correlated with TAC ($r2= 0.683$; $P<0.01$) and DPPH ($r2= 0.538$; $P<0.01$) under the effect of solid- solvent ratio. Negative significant correlations were found between TFC and FRAP ($r2= -0.369$; $P<0.01$), DPPH and FRAP ($r2= -0.591$; $P<0.01$) under the influence of extraction temperature. However, poor correlations were observed among all variables under the influence of extraction time.

Keyword: Antioxidant activity; Extraction; Guiera senegalensis; Phenolic antioxidant